

REMARKS

In responding to the outstanding Office Action, Applicants have made some grammatical amendments to the claims for clarification and improved reading. None of these amendments have been made for purposes of patentability.

Additionally, submitted herewith is a proposed drawing change responsive to numbered Section 2 of the Office Action. In the proposed drawing change, a plurality of ribs has been added to the exterior periphery of the skin as required by the Examiner. No new matter has been added.

A careful review of the Office Action has resulted in the conclusion that, as explained below, none of the pending claims are anticipated or made obvious by Aceti et al. In Aceti et al., an electronics package 12 is formed with a flexible printed circuit 26 having a base 26a, and upright arms 26b and c at each end. The electronics 12 is clearly a structure which is laterally deflectable so as to be slidable into the individual's ear canal.

The requirement that the electronics 12 be laterally deflectable is clearly illustrated by Fig. 10 of the present application. A hearing aid must be capable of making two bends in the ear canal as clearly shown in Fig. 10. This can only be accomplished if the electronics 12 of Aceti et al. is, as noted above, laterally deflectable. Aceti et al. makes this clear when they state:

"As shown in Figs. 1 and 2, the electronics 12 includes a flexible printed circuit 26 having a base 26a and upright arms 26b and 26c at its ends. The flexible printed circuit 26 also includes therein paths of a conductive metal." (Col. 2, lines 29-32, Aceti et al.)

The electronics 12 is enclosed in Aceti et al. in shell 14 which is described as below:

"The shell 14 is a flexible hollow cylindrical element that is adapted to house and protect the electronics 12. The shell 14 is of a molded, flexible plastic material and contains ribs, such as ribs 15 shown in Fig. 2, to orient and retain the electronics 12 therein. The shell 14 is of a material which protects the electronics 12 from moisture and mechanical damage. The shell 14 also provides acoustic features for facilitating incoming and outgoing sound, and has external features, such as ribs 17,

which help retain it in the ear plug 16." (Col. 2, line 64 to Col 3, line 6, Aceti et al.)

Thus, it is clear that neither the electronics 12 nor the shell 14 of Aceti et al. have sufficient rigidity to carry out the insertion function. Once again, as illustrated in Fig. 9 and Fig. 10 of the present application, insertion requires that the housing of the hearing aid, as well as the electronics therein must be flexible enough to make the two bends when passing into the ear canal. The housing must also exhibit sufficient rigidity so as to in general retain the axial shape of the hearing aid so that the distal end thereof will be pushed toward the eardrum, and, will not be compressed for example, when the distal end is attempting to make the first bend when passing into the ear canal.

In Aceti et al., the rigidity required for insertion comes not from the electronics 12, nor from shell 14. Rather, the rigidity required for insertion comes from the ear mold 16. Ear mold 16 is described by Aceti et al. as:

"Ear mold 16 is of a soft, durable and compliant material. It can be of a cold-cured methacrylate, heat-cured methacrylate, heat-cured silicon, polyvinyl chloride, copolymer or polyethylene co-polymer. The ear mold 16 has an inner opening 16a into which the shell 14 containing the electronics 12 is inserted and retained. The outer configuration of the ear mold 16, such as its shape and size, is such that it can be readily inserted in the ear canal of the user and which will flexibly mold itself to the shape of the ear canal." (Col. 3, lines 7-16, Aceti et al.)

Notwithstanding its deformable nature, the material for the ear mold 16 in Aceti et al. must provide enough axial rigidity to make it possible to "readily" insert the distal ear mold end, adjacent to the member 26c, into the ear canal. There is no other structure in Aceti et al. which provides this axial rigidity. As Figs. 9 and 10 of the present application make clear, as a hearing aid is inserted into the ear canal, the sides of the ear canal frictionally engage the outer surface of the hearing aid with forces which resist the insertion process. These forces must be overcome so that the distal end of the hearing aid, corresponding to member 26c of Aceti et al. can be properly located in the ear canal.

A review of the structure of Fig. 2 of Aceti et al., including elements 12, 14 and 16, and their interaction makes clear that Aceti et al. is depending on axial rigidity of the ear mold 16 for insertion. In this regard, shell 14 is not attached to electronics 12. Further, note

that the ribs 15 are at the outer end of the structure of Aceti et al. They do not in any way provide rigidity for the insertion process.

Unlike ribs 15, the rib 17 which is adjacent to end 26c, in combination with the ear mold 16, does contribute to the insertion process. When the proximal end of Aceti et al.'s ear mold 16 is pushed on for purposes of inserting hearing aid 10 into the ear canal, the distal end of the ear mold 16 is forced against rib 17, adjacent to end 26c. This causes the shell 14 and the electronics 12 therein to move with the ear mold 16 during insertion.

It is thus the distal end of the ear mold 16 which is pushing against the rib 17 which makes it possible to insert the hearing aid of Aceti et al. This can only take place if the ear mold 16 has enough axial rigidity, on its own, to overcome the frictional forces from the ear canal. These forces are in a direction opposite to the direction which the ear mold 16 is moving. Thus, the rigidity for insertion of the Aceti et al. hearing aid comes from the exteriorly located ear mold 16. It is not associated with either the structure 12 or the structure 14 therein.

In the Office Action, on the last line of page 2, and the top 2 lines of page 3, the Examiner in rejecting claims 21-22, 25-30, 32-34, 104, 105, 108-113-115-117 as anticipated by Aceti et al. stated the following:

"at least one spine (12) extending axially along an interior surface of the skin, which is attached thereto sufficiently so as to provide insertion rigidity, when inserted into the user's ear canal as claimed."

As described above, the electronics 12 does not provide insertion rigidity in the hearing aid of Aceti et al. It is flexible, being formed of a "flexible printed circuit 26". Further, even if the electronics 12 represented a rigid element, it does not keep either shell 14 or ear mold 16 from being inoperably compressed on insertion unless the ear mold 16 provides the required insertion rigidity to retain its own general axial shape while being inserted. This rigidity at the same time, retains the shell 14 in an elongated condition. As noted above, neither ear mold 16 nor shell 14 are attached to the electronics 12. It is only the interaction between the distal end of the ear mold 16 along with the rib 17, adjacent to the end 26c, that provides the axial insertion rigidity required to successfully insert the structure of Aceti et al. into the user's ear canal.

The Examiner's rationale for arguing that various of the claims of the pending application are anticipated by Aceti et al. is thus not supported by the structure or operational characteristics of Aceti et al.

In addition to the above reasons for non-anticipation, the Examiner failed to identify in the Office Action where Aceti et al. discloses the limitation added by claims 26,109. That limitation:

"at least one spine is integrally molded with the skin"
(claims 26, 109).

as described above is completely unmet by Aceti et al. Hence, for at least the above reasons, none of the pending claims are anticipated by Aceti et al.

In rejecting claims 23, 24, 106 107 and 114 as obvious and unpatentable over Aceti et al., the Examiner continued to interpret the electronic package 12 of Aceti et al. as providing the insertion rigidity required for inserting Aceti et al.'s hearing aid into a user's ear canal. As described above, that is clearly not the case. The differences between Aceti et al. and the pending claims 23, 24, 31, 106, 107 and 114 teach away from a conclusion of obviousness. Further, relative to claims 24 and 107, the Examiner has argued that:

"Aceti et al. do not clearly teach the hearing aid further including a sound conductive tube as claimed. Since providing a sound tube for a hearing aid is very well known in the art, it therefore would have been obvious to one of skill in the art at the time the invention was made the provide a suitable sound tube for the hearing aid, in order to desirably deliver acoustic output to the user." (Office Action, pg. 3, last 3 lines and pg. 4, first two lines)

The above statement is irrelevant as far as claims 24 and 107 are concerned. Claims 24 and 107 add the following limitation to the combination expressed in the respective independent claim, namely 21 and 104:

"wherein the spine comprises a vent tube that is attached to the skin substantially along its length."

The "sound tube" referred to in the Office Action, noted above, is completely unlike and provides a completely different function than the claimed structure. Nothing about Aceti et al. suggests, discloses or teaches modifying hearing aid 10 therein so as to make either of claims 24, 107 obvious.

In rejecting claims 31 and 114 as obvious and unpatentable over Aceti et al., the Examiner apparently is referring to ear mold 16 in connection with the following statement:

"Since providing a desirable otoplastic material for the hearing aid housing is very well known in the art, it therefore would have been obvious to one skilled in the art at the time the invention was made to provide a suitable otoplastic material, such as at least one of an open cell foam, a closed cell foam, and a fabric for the hearing aid, in order to provide more comfort to the users." (Office Action, pg. 4)

However, the structure referred to by the Examiner, the housing (ear mold 16 of Aceti et al.) is quite unlike the structure of pending claims 31 and 114. Those claims all include the following limitations:

"an audio output transducer in the internal region wherein the transducer is surrounded, at least in part, by a compressible matrix (claim 29, 112) ... wherein the matrix comprises at least one of an open cell foam, a closed cell foam, and a fabric." (claims 31, 114)

Thus, it is submitted that the Examiner's obviousness rejection is not supported by any teaching, suggestion or disclosure of how to modify Aceti et al. so as to make claims 31, 114 obvious as required by the rules of the Patent Office and the Federal Circuit.

For at least the above reasons, the pending claims are all allowable. Several newly added claims are also allowable.

Allowance of the application is respectfully requested.

Respectfully submitted,

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Specification Amendments

Please amend the second full paragraph on page 10 of the application as follows:

The aid 10 includes a thin, elastomeric skin or sheath 12 which exhibits little or no resistance to either axially or laterally applied forces. In one embodiment, for example, the skin 12 can be so soft as to not be capable of supporting itself against the force of gravity.

The skin 12 can optionally carry a plurality of outwardly oriented ribs 12.